

Fisheries Research Unit, Bangor

Ice Fishing Opportunities for Catchable Trout

Most of the brook trout fishing opportunity for winter anglers in central and southern Maine occurs in lakes and ponds that are stocked in the fall with 10-14 inch trout by IFW's Hatchery Division. This fall stocking is part of the Department's Catchable Trout Stocking Program. Approximately 20,000 of these legal-sized (Catchable Trout) brook trout are stocked each fall in these regions alone. The intent of these stockings is to provide immediate trout fishing opportunity in waters that do not sustain year round brook trout fisheries for a variety of reasons, such as: lack of suitable cold-water habitat in summer, competing fish species, or no brook trout spawning habitat. The trout that do survive the winter provide fishing opportunity right after ice out but these trout very seldom live through the summer. Waters in this part of the state experience moderate to high angler use during both the open water and ice fishing seasons, due to their close proximity to population centers.

The objective of the "Catchable Trout Study" as we call it, is to determine what conditions provide the best returns to anglers. A better understanding of where catchable trout perform best will help guide future stocking decisions to maximize angling success. As such our focus is on the environmental parameters of the stocked waters, stocking methods, quality of the stocked trout, and public access...It is always up to the anglers to catch the fish though!

As part of this study IFW fisheries biologists from the Gray Office, Sidney Office, and the Lake Research Group will be conducting creel surveys on 16 waters, ranging in size from 6 to 665 acres, during the first four weeks of the 2008 ice fishing season. These study waters are:

Barker (Parker) Pond, Lyman
Bear Pond, Waterford
Biscay Pond, Bremen
Cochnewagon Pond, Monmouth
Crystal Pond, Gray
Flying Pond, Vienna
Keewaydin Lake, Stoneham
Keoka Lake, Waterford

McGrath Pond, Oakland
Nequasset Lake, Woolwich
Otter Pond #2, Standish
Round Pond, Lyman
Sabbathday Lake, New Gloucester
Salmon Pond (Ellis Pond), Oakland
Wilson Pond, Wayne
Worthley Pond, Poland

Ice fishing for brook trout requires a different approach than fishing for brown trout, landlocked salmon, or togue. Shallow water and structure are probably the most important things to think of when ice fishing for brook trout. Water less than 10 feet deep and that are associated with aquatic vegetation, boulders or rocky points are usually excellent locations to fish for brook trout. If fishing traps use worms or small minnows, placing the bait just under the ice. Jigging with small jigs (rubber or marabou bodies) or spoons can at times bring fast action. Remember that during the winter water temperatures are suitable for trout throughout a lake and that prey items favored by brook trout will be in these shallower areas. It is hard to imagine but the rocky point where you catch bass during the summer can be the best place to fish for brook trout during the winter, but give it a try, you might be surprised by the success you have!

We look forward to seeing you out there on the ice!

By Joe Dembeck, Research Fisheries Biologist, Bangor Office

Introduction

Lake trout (togue) are a long-lived species, and individual fish commonly live for 20+ years. Given the species' longevity and association with deep, coldwater lakes, fisheries biologists have many questions about Maine lake trout populations that need answers in order to manage the species more effectively. Lake trout currently inhabit 137 lakes and ponds throughout the state, with most populations being wild and self-sustaining because of their ability to spawn along shallow lakeshores and offshore shoals having the appropriate rock and boulder substrate. Detailed studies have been conducted on spawning lake trout in various Maine waters over the past 60 years, but no studies have tracked individual fish over a time period greater than 3 years nor have all available spawning locations in a specific water body been sampled. By knowing the yearly frequency at which lake trout spawn, biologists can better understand the recruitment potential of lake trout populations in specific waterbodies and more accurately assess impacts to the forage base. With this information, managers can implement regulations that will maintain the population while providing quality fishing for anglers. For waters where wild lake trout populations are currently increasing and adversely impacting the forage base (e.g., Moosehead Lake, Sebago Lake, and Beech Hill Pond), a greater understanding of lake trout spawning and recruitment will assist in management of the species as well as the forage populations in these waters.

During September and October 2006, Maine Department of Inland Fisheries and Wildlife (MDIFW) biologists from the Jonesboro Office conducted detailed surveys of lake trout spawning habitat in Hopkins Pond (Mariaville), Phillips Lake (Dedham), and Tunk Lake (T10 SD). Jonesboro and Bangor biologists returned to each of these waters in late October 2006 to sample for lake trout in those areas previously identified as providing suitable spawning habitat. One night of boat electrofishing was conducted on each water resulting in 43 lake trout collected from Hopkins Pond, 8 lake trout from Phillips Lake, and 3 lake trout from Tunk Lake.

To gain knowledge of lake trout spawning characteristics, MDIFW biologists developed a multi-year study of a representative wild lake trout population in Maine. The project consists of a detailed investigation of the spawning activity of wild lake trout in Hopkins Pond (including timing, habitat use, site fidelity, and whether mature individuals spawn annually). The results of this study will assist MDIFW biologists in sampling efforts on lake trout waters throughout the state by identifying key variables that predict lake trout spawning activity. This will allow MDIFW biologists to maximize the relevancy and quality of data gathered on other lake trout waters, and provide for more efficient use of staff time. Additionally, the data on spawning frequency of lake trout will allow for a more accurate assessment of lake trout recruitment, further assisting biologists in managing Maine's lake trout fisheries.

The objectives of this study are to:

- 1) Evaluate the characteristics of the spawning lake trout population in Hopkins Pond.
- 2) Determine the environmental parameters that are the most reliable indicators of the lake trout spawning period.
- 3) Evaluate spawning frequency (i.e., annual vs. biennial), for tagged male and female lake trout.
- 4) Determine site fidelity for spawning lake trout.
- 5) Determine the angler harvest rate for adult lake trout in Hopkins Pond.

Methods

Hopkins Pond was selected as the study water based on the following reasons: the presence of a healthy, wild lake trout population; previous success in collection of lake trout during the spawning period; available spawning areas; adequate boat access; small surface area; and close proximity to the Jonesboro and Bangor offices.

Beginning in October 2007, a minimum of five nights of boat electrofishing will be conducted annually by MDIFW staff and UMO student volunteers at the identified spawning locations in Hopkins Pond. All lake trout collected will be measured, weighed, sexed, spawning status recorded, and implanted with a Passive Integrated Transponder (PIT) tag prior to their release. Each PIT tag is uniquely numbered, permitting identification and data collection for individual lake trout throughout the study period.

During the course of this study up to 400 lake trout will be implanted with PIT tags and marked with an adipose fin clip, with a maximum of 125 individuals to be tagged each year in order to track individual spawning lake trout from a minimum of three consecutive spawning years, 2007, 2008, and 2009. The premise behind tagging mature adults in multiple spawning years is to increase the probability of encountering any fish that do not spawn annually.

The recapture of tagged individuals will allow biologists to monitor their spawning activity and estimate the total spawning population of lake trout in the pond. All captured lake trout will be scanned for the presence of a PIT tag, and if none is present, one will be implanted until all tags are utilized. Environmental conditions (water temperature, air temperature, photoperiod, wind speed, wind direction, weather, moon phase) will be monitored along with spawning activity to determine if one or more variables are reliable indicators of spawning onset and activity. As PIT tags have an unlimited life period, MDIFW biologists are planning to continue annual monitoring of the spawning population in Hopkins Pond, as long as a sufficient number of PIT tagged individuals remain in the pond.

During the winters of 2008, 2009, and 2010 MDIFW biologists will perform winter creel surveys on Hopkins Pond to determine the harvest rate of tagged fish and determine a population estimate of adult lake trout in the pond. Creel surveys will be conducted during January and February each year with biologists surveying one weekday and one weekend day each week.

Results

Six boat electrofishing sampling events were conducted between October 16 and November 2, 2007, collecting a total of 118 individual lake trout. Each lake trout in the sample was implanted with a PIT tag and released back into the pond. The 118 individual lake trout were comprised of 92 males, 23 females, and 3 of undetermined sex due to immaturity during this spawning season. For both males and females, the average length was 21 inches and the average weight 2.9 pounds.



*Fisheries Biologist Joe Overlock (Jonesboro Office)
releasing a tagged lake trout at Hopkins Pond, 2007.*

Other species observed during the electrofishing surveys included: landlocked salmon, brook trout, brown bullhead, white sucker, creek chub, common shiner, blacknose dace, rainbow smelt, pumpkinseed sunfish, and redbreast sunfish.

Biologists will begin their creel surveys of ice fishermen on the pond Starting January 1, 2008.

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A Statewide Assessment for Wild Brook Trout Populations and Habitat in Maine

Maine maintains the majority of healthy brook trout populations remaining in the United States, but suffers from a poor understanding of its stream trout resources. Also, the recent Eastern Brook Trout Joint Venture (EBTJV) threat assessment of wild brook trout throughout the eastern range identified habitat fragmentation, forestry, and agricultural practices as the primary



A bulldozed Maine stream, picture taken around 1950

contributors to habitat loss and degradation. Recent habitat assessments of western Maine streams indicate extensive stream degradation mostly associated from past practices associated from log driving activities. However, log drives have not occurred there for nearly a half century, and it is likely that current land uses contribute to continued stream instability. The effects of forestry and agricultural practices on Maine's streams may include accelerated runoff, loss of instream structure that contributes to pool formation, increased stream warming from reduced tree canopy cover and increased sediment inputs from the riparian and upslope areas. Hence, we have undertaken a statewide stream survey

effort to assess fish community structure and stream habitat condition for fishery management and conservation planning purposes.

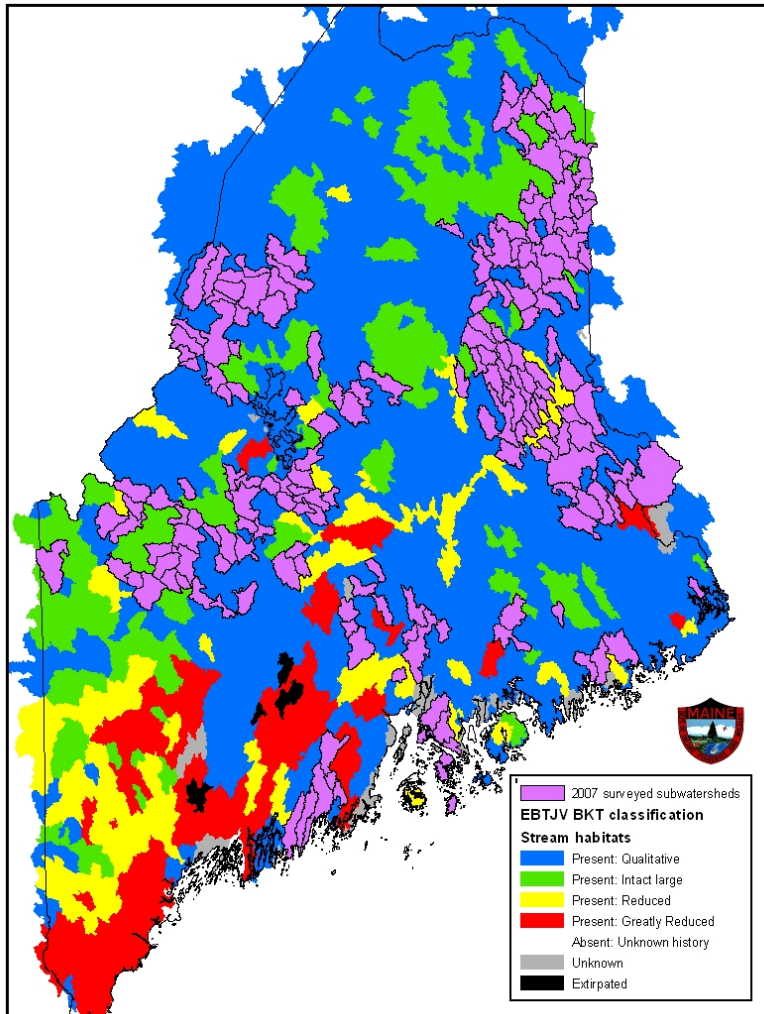
MDIFW, in conjunction with the USDA-Natural Resources Conservation Service, Trout Unlimited's Embrace A Stream program, and the Maine Outdoor Heritage Fund initiated a statewide stream survey effort in 2007. The goals are to survey enough sites in order to update



A beautiful Maine stream dwelling brook trout

the information needs to classify ~200 additional subwatersheds per year for wild brook trout status for the EBTJV. This is no small task! We estimate that for this to happen, we need to acquire brook trout status information, either through direct survey efforts or sharing comparable data from other sources, for approximately 1500 stream reaches, or sites, per year.

MDIFW added 5 seasonal survey crews and an assistant cartographer in 2007 to assist with this



Purple areas denote subwatersheds surveyed in 2007

statewide effort. Field crews were trained to follow MDIFW survey and biosecurity protocols, field safety, navigation in remote areas, fish species identification, and data management procedures. Up here in Maine, we were also fortunate to have a summer field season with some of the best weather in years! After two years in a row (2005-2006) of precipitation levels much higher than normal, 2007 was a year of average precipitation and stream flows remained workable throughout the whole field season from May – October. All factors, great weather patterns and extremely dedicated crewmembers, contributed to a phenomenal field season where we surveyed fish habitat and brook trout populations in 946 total stream reaches! This dataset will allow us to update the status information for approximately 174 subwatersheds for the EBTJV. In addition, our continuing data

management efforts, additional field surveys conducted by regional staff, and acquisition of comparable, shared data from other sources, we will easily hit our target for updating brook trout status information in ~ 200 Maine subwatersheds.

Now the fun really begins as we update the Maine Streams database and associated map information. But preliminary analysis confirms intact brook trout status within most of the surveyed subwatersheds! Another positive result of this year's effort has been the surprisingly few occurrences of any non-native species encountered in brook trout stream habitats. This winter, we will continue analyzing the data generated from this effort and by spring, we should have some very useful information regarding the status of the habitat within the surveyed areas. So, stay tuned to our project – we have another year of intensive statewide effort to go!

A New Guide to Maine's Freshwater Fish Species

There are 63 species of fish known to inhabit the freshwater streams, rivers, ponds, lakes and bogs of Maine for at least part of their life cycle. There are an additional 3 species of fish

classified as “estuarine”, meaning they primarily live in the brackish conditions where rivers meet the sea. Of those species that live in both fresh and saltwater, there are two types: catadromous and anadromous. Catadromous species spend the growth phase of their life cycle in fresh water and then travel to saltwater areas to spawn. The only example of a catadromous fish in Maine is the American Eel. Anadromous species are somewhat more common in Maine, including such species as Atlantic salmon, two species of sturgeon, the river herrings, rainbow smelt, and some populations of brook trout. These species typically grow to an adult size in saltwater and then return to freshwater for spawning and juvenile growth. However, most freshwater fish in Maine are strictly that, spending their entire life cycle without a taste of salt water. Yellow perch, 18 different species of minnows, bass, and suckers are but a few examples of this group.

With all of this diversity in Maine’s freshwater fish, it’s important to keep track of them. Accurate identification of all fish encountered during survey work is necessary for monitoring the long-term health of all populations. However, identification of some of the smaller species can be quite tricky, sometimes requiring the use of a microscope or other tools for confirming a fishes’ species.



A few of Maine’s lesser known native fishes. Slimy sculpin (top), redfin pickerel (middle), bridled shiner (bottom). Images not shown to size.

As we were planning for our statewide brook trout stream survey work this past summer, it was important that we got as much information as we could out of our survey efforts. There has always been a general lack of knowledge about game and commercial fish populations in Maine’s streams, but it’s even more pronounced with non-game species. To a large extent, this has been a result of much greater efforts placed on our lake and pond management programs. But a historical lack of interest in the smaller fish species has also played a part. In addition, the relative difficulty in correctly identifying the smaller members of Maine’s fish fauna has not helped.

There have only been two guides published to identify Maine’s freshwater fish. While they do an excellent job with differentiating the larger, more common species, they are incomplete with regards to many of the species of minnows and other less common species. Also, there have been several species of fish accidentally or illegally introduced into

Maine waters since the previous guides were published. It is important that we keep track of these introduced populations as well.

In order to provide our stream survey workers with a comprehensive field guide for fish identification, we created a “key”, or step-by-step identification process, for all species known to occur in Maine as well as a few species that we know occur just over our borders in Canada or New Hampshire. This involved gathering taxonomic descriptions from several other regional guides to freshwater fish and adapting them to fit Maine’s species assemblage.

Using those same regional guides, we also compiled what we felt was the relevant biological data for each species, including life history information (food eaten, typical size, reproductive biology) and a description of the fishes’ “range”, or the areas that the fish is known to occur in. Lastly, we included a map of each fishes’ known distribution in Maine.

This guide, still in a draft form, was used successfully by our stream survey crews during the summer of 2007, and will be further utilized during our survey efforts in 2008 and beyond. After

all of our survey results are in from those two summers, we will use the data collected to update the Maine distribution maps for each species known to inhabit Maine.

Sea-run Brook Trout Project

Brook trout in Maine live in a variety of habitats, from tiny headwater streams to large rivers and small ponds to the largest of Maine's lakes. Brook trout use differing life strategies depending on the local conditions. Brook trout in Maine's coastal streams have a unique strategy known as anadromy. Anadromous brook trout are those that leave their freshwater juvenile habitats and enter salt water conditions for a portion of their life, then return to freshwater to spawn. These fish are known by a number of common names including "salters" and sea-run trout. There has never been an intensive survey of Maine's sea-run brook trout and their current distribution, population status and potential threats in Maine are uncertain.

In response to this lack of information, the Maine Department of Inland Fisheries and Wildlife (MDIF&W) started an effort to gather needed data on these unique populations in a variety of ways. One method involves enlisting the assistance of volunteer anglers to collect data over a wide area of the state and report their angling effort, success, and fished streams to MDIF&W fisheries biologists. The volunteer angler surveys began in 2006 and will continue through 2008. At the end of the 2008 fishing season the data will be analyzed and used to determine the future needs of the angler survey and sea-run brook trout in general. The data collected by anglers to date has been excellent, however MDIF&W is interested in increased public participation in 2008. If you would like to participate in the volunteer angler surveys please contact MDIF&W Fisheries Research Section: Merry Gallagher at (207) 941-4381 or merry.gallagher@maine.gov

A collaborative research effort is underway where a single population of sea-run brook trout is being closely studied and monitored. The partners in this effort include MDIF&W, the National Park Service, the University of Maine, and the Conte Anadromous Fish Research Laboratory. Stanley Brook, in Acadia National Park, is approx. 1.2 miles long and drains directly into the Gulf of Maine. This brook contains both sea-run and year round resident brook trout. Biologists are looking at the movement of brook trout in and out of Stanley Brook. Brook trout are caught and tagged with electronic transmitters at various times throughout the year. A data-logging receiver is located at the Route 3 bridge, a little upstream of the estuary. This receiver is capable of determining which individuals are passing and whether they are going up into the stream or down to the ocean. A future receiver will be placed at a location further downstream at the outlet of the stream into the estuary. The brook is also surveyed with a backpack receiver to determine the location of all tagged fish three times a year. The data to date seems to indicate that sea-run brook trout head to the ocean from April through June and return to freshwater anytime between May and August although there is still a lot to learn about the timing, duration and causes of their estuarine forays.

A similar project is getting underway in Cove Brook. Cove Brook is located in Winterport, ME and drains into the Penobscot River approx. 11.5 miles above the Waldo Hancock Bridge. This stream is unlike Stanley Brook in that it has different fish species, land use, and drains into the Penobscot River instead of the Gulf of Maine. A University of Maine graduate student will be leading this project.

MDIF&W staff also surveyed a number of coastal streams in the Downeast Maine, Pemaquid and Stonington areas. These surveys were part of our Eastern Brook Trout Joint Venture efforts and yearly MDIF&W stream fishery surveys. From these surveys, sea-run brook trout were verified in several coastal streams. Blood samples from some sea-run brook trout in the coastal Downeast area were collected in collaboration with Dr. Sharon Maclean at NOAA-Fisheries. She is screening for infectious salmon anemia virus (ISA) in various wild species. The purpose is to find if sea-run brook trout act as a reservoir for ISA in the wild. ISA is a virus that may reside in various marine species but causes mortality in farm raised Atlantic Salmon and is a threat to wild anadromous salmon.

An Unnamed Brook in Belfast, ME has provided MDIF&W with a unique stream restoration opportunity. Recently Maine DOT was looking at rehabilitating a culvert on this brook running

under Rt. 1 and after surveying the stream, it was found that this stream had a thriving wild brook trout population. The survey found 72 brook trout in 300' of stream and the Rt.1 culvert was subsequently replaced with the ability to pass fish to the upstream side. The brook is a small stream running directly into Belfast Bay. It is very likely that this stream had a sea-run brook trout population in the past. However there is more at work on this stream than just the new Rt. 1 culvert. After a look at the rest of the stream it was determined that this stream had several fish passage issues before it empties into the ocean. The stream was diverted in the past and currently it runs through a motel lawn that contains several small dams and culverts. The project is in the stage of seeking funding for reconnecting the stream to its original channel thereby bypassing the remaining barriers and creating fish passage from the ocean to upstream sections. The hope is to restore sea-run trout to this native brook trout stream.

MDIF&W is also partnering with the University of Maine in a project to identify individual sea-run brook trout from a population of coastal trout. This will be achieved through analysis of the chemical composition in the fish's scales or other body tissues. Through a trout's life it eats various food items such as insects, snails, and fish. These food items leave behind chemical markers within the fish's body tissues and different food sources leave different chemical markers. Fish that venture into the ocean have a different diet than those residing in the freshwater streams. By analyzing the scales, or other body tissues of trout, we hope to be able to see a different set of markers for fish that have lived in the ocean for a portion of their life than those that stayed in freshwater. This research is just getting underway and has many steps yet to be worked out.